

### CLAIMS

1. A silicon dioxide film removing method of removing a silicon dioxide film formed on a surface of a workpiece in a processing vessel that can be evacuated;

characterized in using a mixed gas containing HF gas and NH<sub>3</sub> gas for remove the silicon dioxide film.

2. The silicon dioxide film removing method according to claim 1, wherein a processing temperature at which the workpiece is processed is in the range of 100°C to 600°C.

3. The silicon dioxide film removing method according to claim 1 or 2, wherein a processing pressure at which the workpiece is processed is in the range of 26 to 53,200 Pa (0.2 to 400 torr).

4. The silicon dioxide film removing method according to claim 1, wherein the silicon dioxide film is a chemical oxide film formed by a chemical process, and a processing temperature for achieving etch selectivity for the chemical oxide film to silicon is in the range of 100°C to 400°C.

The silicon dioxide film, namely, the chemical oxide film, can be etched and removed by etching at a high degree of etch selectivity.

5. The silicon dioxide film removing method according to claim 4, wherein the processing pressure is in the range of 26 to 53,200 Pa (0.2 to 400 torr).

6. The silicon dioxide film removing method according to claim 4 or 5, wherein the flow rate ratio of HF gas to NH<sub>3</sub> gas is in the range of 10:1 to 1:50.

7. The silicon dioxide film removing method according to claim 1, wherein the silicon dioxide film is a chemical oxide film formed by a chemical process, and a processing temperature for achieving etch selectivity for the chemical oxide film to a silicon nitride film is in the range of 200°C to 600°C.

8. The silicon dioxide film removing method according to claim 1, wherein the silicon dioxide film is a chemical oxide film formed by a chemical process, and a processing temperature for achieving etch selectivity for the chemical oxide

film to a silicon dioxide film formed by decomposing TEOS is in the range of 300°C to 400°C.

9. The silicon dioxide film removing method according to claim 1, wherein the silicon dioxide film is a chemical oxide film formed by a chemical process, and a processing temperature for achieving etch selectivity for the chemical oxide film to a thermal oxide film is in the range of 100°C to 600°C.

10. The silicon dioxide film removing method according to any one of claims 7 to 9, wherein the flow rate ratio of HF gas to NH<sub>3</sub> gas is in the range of 1:10 to 1:50.

11. The silicon dioxide film removing method according to any one of claims 7 to 9, wherein the processing pressure is 1011 Pa (7.6 torr) or below.

12. The silicon dioxide film removing method according to any one of claims 1 to 3, 5, 6 and 10, wherein the silicon dioxide film is a natural oxide film.

13. A processing system comprising:  
a workpiece holding means for holding workpieces;  
a heating means for heating the workpieces;  
an evacuating system for evacuating the processing vessel;  
an HF gas supply system for supplying HF gas into the processing vessel; and  
an NH<sub>3</sub> gas supply system for supplying NH<sub>3</sub> gas into the processing vessel.

14. The processing system according to claim 13 further comprising an oxidizing gas supply system for supplying steam or gases for generating steam into the processing vessel.

15. The processing system according to claim 13 further comprising a silicon film forming gas supply system for supplying a silicon film forming gas into the processing vessel.